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Psychopathic Traits in College Students: Electrodermal Reactivity, Anxiety, Disinhibition, Risk-Taking, and Executive Functioning

Robert L. Bare
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Robert L. Bare entitled "Psychopathic Traits in College Students: Electrodermal Reactivity, Anxiety, Disinhibition, Risk-Taking, and Executive Functioning." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Derek R. Hopko, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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PSYCHOPATHIC TRAITS IN COLLEGE STUDENTS:

ELECTRODERMAL REACTIVITY, ANXIETY, DISINHIBITION,

RISK-TAKING, AND EXECUTIVE FUNCTIONING

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Robert Lewis Bare

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DEDICATION

This dissertation is dedicated to my parents, Donald and Catherine Bare, for always providing support and encouragement, and to Lee, Henderson, and Eli, for grounding me and helping me focus on what really matters.

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ABSTRACT

A robust finding is that psychopaths exhibit electrodermal hyporeactivity in the presence of stimuli that elicit anxiety in non-psychopathic samples. This finding has been associated with decreased anxiety, although recent research suggests the relationship between psychopathic traits and electrodermal hyporeactivity may be related to other correlates of psychopathy (i.e. decreased inhibitory control, risk-taking, and executive functioning deficits). The present study was a preliminary examination to assess electrodermal reactivity, disinhibition, risk-taking, and executive functioning in a sample of undergraduate students with varying degrees of psychopathic characteristics. Results generally did not support hypothesized relationships between psychopathic traits, physiological responsivity, and executive functioning deficits. Specifically, higher self-reported psychopathy scores were not predictive of depressed skin conductance responses to unpleasant images nor was psychopathy related to executive functioning deficits. However, consistent with hypotheses, Self-Report Psychopathy -II factor 2 scores (antisocial behaviors) were significantly related to both self-reported impulsivity and a behavioral measure of risk-taking. Implications and suggestions for future research are discussed.

TABLE OF CONTENTS

CHAPTER PAGE

1 INTRODUCTION....1
Methods of Identifying Psychopaths....2
Relationships Between Anxiety and Psychopathy....5
The Study of Psychopathy in Nonclinical Samples....7
Risk-taking, Disinhibition, and Psychopathy....8
Executive Functioning and the Psychopath....10
Fowles' Model of Psychopathy....11
Statement of the Problem....12

2 METHOD....15
Participants....15
Materials....15
Self Report Measures....15
Behavioral Measures....18
Psychophysiological Measures....20
Procedure....20

3 RESULTS....22
Zero Order Correlations and Descriptive Data....22
Visual Stimuli Manipulation Check....23
Regression Analyses....25

4 DISCUSSION....27

LIST OF REFERENCES....33

APPENDIX....48

VITA....57

LIST OF TABLES

TABLE PAGE

A-1 Descriptive Data for Sample....49

A-2 Correlations and Descriptive Data for all Variables....50

A-3 Correlations Between Self-Report Measures and Physiological Responsivity....51

A-4 Skin Conductance Responsivity to Unpleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....52

A-5 Skin Conductance Responsivity to Pleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....52

A-6 Skin Conductance Responsivity to Neutral Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....53

A-7 Heart Rate Responsivity to Unpleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....53

A-8 Heart Rate Responsivity to Pleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....54

A-9 Heart Rate Responsivity to Neutral Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....54

A-10 Self-reported Impulsivity as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....55

A-11 BART Adjusted Total Pumps as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....55

A-12 Number of BART Explosions as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....56

A-13 WCST Perseverative Errors as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety....56

CHAPTER 1

INTRODUCTION

Psychopaths represent an extreme variant of antisocial individuals whose behaviors presumably result from the interaction of biological factors and ineffective socialization agents (Lykken, 1995). Psychopaths generally are irresponsible, have unstable interpersonal relationships, and have difficulty exercising self-control in situations in which they may receive significant consequences for their actions (Gray, 1987; Hare, 1980; Lykken, 1995; Newman, 1987). They also exhibit a remarkable disregard for others and may engage in a wide range of criminal behaviors. One of the most consistent findings in experimental psychopathology is the marked electrodermal hyporeactivity exhibited by psychopaths in response to aversive stimuli (Fowles, 2000; Fowles & Missel, 1994; Hare, 1978; Lykken, 1995). Although this phenomenon is well-documented among clinical samples, empirical demonstrations of psychophysiological responsivity in non-clinical individuals with psychopathic characteristics are relatively sparse. Moreover, other correlates of psychopathy identified in clinical samples have yet to be investigated in non-clinical cohorts. Accordingly, the purpose of this dissertation is to: (a) further examine electrodermal reactivity within a non-clinical sample of college students, and (b) assess whether other characteristics observed among psychopaths generalize to non-clinical samples. With regard to the latter objective, variables of interest include decreased anxiety, disinhibition (risk-taking), impulsivity, and executive function deficits (Fowles, 2000).

In his pioneering study of psychopathic individuals, Cleckley (1941) provided the first systematic description of the core facets of psychopathy that laid the foundation for subsequent assessment and categorization strategies. Using extensive case descriptions, Cleckley identified 16 characteristics believed to be fundamental to the description and identification of psychopaths. Chief among these were absence of "nervousness," failure to learn by experience, and general poverty in affective reactions. Pioneering research into the physiological and behavioral correlates of psychopathic behaviors used these criteria to identify psychopathic individuals (Lykken, 1957). Many researchers and clinicians found the subjective rating of Cleckley's criteria to be imprecise, however, which was reflected in poor inter-rater reliability and subsequent problems with internal validity (Lykken, 1995).

Methods of Identifying Psychopaths

It should be noted that the majority of research exploring relationships between psychopathy and other constructs utilizes "primary" as opposed to "secondary" psychopaths (Lykken, 1995). Lykken (1995) suggested primary psychopaths show an underdeveloped fear response to stimuli that would result in anxiety or fear in non-psychopaths. Consequently, primary psychopaths may lack the immediate fearful arousal related to situations or behaviors that might inhibit them from engaging in behaviors that could lead to punishment or unpleasant consequences. Further, he suggested this deficit prevents primary psychopaths from becoming appropriately socialized. Secondary psychopaths, on the other hand, exhibit many of the same behaviors as primary psychopaths, but their antisocial behaviors are not due to an inability to experience fear. On the contrary, secondary psychopaths may show similar fear responses as non-clinical individuals, but the potential positive consequences of their actions (i.e. acquiring wealth, engaging in thrilling behavior) outweigh any negative consequences they may experience. For the purposes of the present research, the terms psychopath and psychopathy will be used to refer to behaviors and characteristics of Lykken's primary psychopaths.

In an attempt to increase the precision of identifying psychopaths, Hare and colleagues developed the Psychopathy Checklist (PCL; 1985) and its revision, the Psychopathy Checklist-Revised (PCL-R: 1991). This clinician-administered instrument has become the most widely used means of assessing psychopathy and includes 20 items that are based on the original Cleckley criteria. In addition to a total score, the PCL-R yields scores on two factors. Factor 1 assesses the affective dysregulation component of psychopathy, or the callous and unemotional traits of psychopaths (Harpur et al., 1989). In contrast, factor 2 is related to behaviors that are reflective of a chronically unstable and antisocial life-style (Hare, 1991). Items included on this factor describe disinhibition, irresponsibility, and thrill seeking behaviors. Compared to factor 1, factor 2 tends to correlate more highly with the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 1994) antisocial personality disorder diagnosis (Harpur et al., 1989) and also is more associated with intelligence and self-reported antisocial behavior (Hare, 1991). The PCL-R generally has been demonstrated to be a reliable and valid instrument in identifying psychopaths (Hare, 1991; Fulero, 1995; Stone, 1995).

While the PCL-R has been shown to be effective in the assessment of psychopaths, it has been suggested that supplemental information might further improve the discriminant validity of the instrument (Fowles, 2000; Lykken, 1995). For example, researchers have suggested that self-report measures might be useful in identifying psychopathic traits, and it has been theorized that self-report measures may assist is assessing psychopathic traits along a continuum of severity, which may be particularly important among noninstitutionalized samples (Levenson, Kiehl, & Fitzpatrick, 1995). Whereas more blatant psychopathic behaviors assessed via the PCL-R may only infrequently be endorsed by non-forensic samples, self-report measures (generally being more extensive) may aid in detecting the more subtle psychopathic characteristics. Various self-report measures have been used to attempt to identify psychopathic traits. The Self-Report Psychopathy Scale (SRP-II: Hare, 1991) has been developed as a self-report analogue to the Psychopathy Checklist - Revised. Other methods of assessing psychopathy have included global ratings of psychopathic traits based on Cleckley criteria and the diagnostic criteria for DSM-IV Antisocial Personality Disorder (Hare, 1996), the Minnesota Multiphasic Personality Inventory -2 (MMPI-2: Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), the Socialization scale from the California Personality Inventory (CPI: Gough, 1969), and the Psychopathic Personality Inventory (PPI: Lilienfeld & Andrews, 1996). The Personality Diagnostic Questionnaire – Revised (PDQ-R) ASPD scale (Hyler & Rieder, 1987) also has been used as a self-report measure of psychopathy, although it initially was designed to measure the criteria for Antisocial Personality Disorder. Researchers have generally found that self-report measures show adequate convergent validity with constructs related to psychopathy such as boredom susceptibility, antisocial behaviors, and disinhibition as well as divergent validity with constructs such as anxiety, agreeableness, and conscientiousness (Forth, Brown, Hart, & Hare, 1996; Levenson, Kiehl, & Fitzpatrick, 1995; Lilienfeld & Andrews, 1996; Lynam, Whiteside, & Jones 1999; Zagon & Jackson, 1994).

Relationships Between Anxiety and Psychopathy

As mentioned previously, researchers have postulated that psychopaths are less likely to experience anxiety-related responding in conditions where most nonpsychopathic individuals demonstrate increased anxiety (Cleckley, 1976; Hare, 1980; Lykken, 1957). Studies of the relationship between anxiety and psychopathy generally have found that psychopaths show reduced electrodermal reactivity (reduced skin conductance responses--a physiological correlate to decreased anxiety) in anticipation of and during the presentation of aversive stimuli (cf. Fowles, 2000). Lykken (1957) initially demonstrated diminished electrodermal reactivity in psychopathic individuals along with decreased anxiety on self-report questionnaires and behavioral deficits in the form of inabilities in learning to avoid aversive stimuli. These findings are robust across numerous experiments using various stimuli and methodologies (Schachter & Latane, 1964; Hare 1965; Hare & Quinn, 1971; Mathis, 1970; Waid, & Orne 1982).

In a more recent investigation conducted by Patrick et al. (1994), psychopathic individuals demonstrated smaller physiological responses to fear-related imagery relative to neutral imagery. In particular, subjects who were high on the Antisocial Behavior factor of the Psychopathy Checklist - Revised showed deficits in physiological responsivity relative to subjects who were low on both PCL-R factors. Similarly, Herpertz et al. (2001) found that compared to non-clinical controls and individuals with borderline personality disorder, psychopathic individuals showed decreased electrodermal responses to emotional slides.

Despite these findings, a recent review of the literature indicates that electrodermal hyporeactivity in psychopaths may not solely be a function of decreased anxiety (Fowles, 2000). In a recent experiment, Schmitt and Newman (1999) attempted to clarify the relationship between anxiety and psychopathy. These authors reported problematic methodological inconsistencies across studies whereby the construct of anxiety has been assessed using different operational definitions and methods of assessment. They also indicated that inconsistent findings may be an artifact of the notion that psychopaths may demonstrate higher levels of self-reported anxiety due to the unpleasant experiences that result from an antisocial lifestyle (e.g. incarceration, court proceedings, financial burdens). Thus, when anxiety is observed among psychopaths, it may be an effect of consequences associated with antisocial behaviors rather than a pre-existing and defining feature of the disorder. Indeed, Schmitt and Newman (1999) administered a number of self-report anxiety and psychopathy scales and reported that the traditional view of psychopathy and anxiety as inversely related may be disputable, with certain aspects of anxious responding potentially being unrelated to psychopathy, including anxiety sensitivity, trait anxiety, somatic anxiety, negative emotionality, and fear. Several other researchers suggest that psychopathy may even be positively correlated with anxiety as assessed via the State-Trait Anxiety Inventory (Ray, 1983) and the Welsh Anxiety Scale (Schmitt & Newman, 1999; Sutton et al., 2002). Providing further testimony to the complex interrelation of psychopathy and anxiety, different dimensions of psychopathy may more or less be associated with anxious responding. For example, as compared with callous and unemotional features of psychopathy (i.e., factor 1 of the Psychopathy Checklist – Revised; Hare, 1991), conduct and behavioral problems may be more associated with trait anxiety [i.e., factor 2 of the Psychopathy Checklist - Revised; Hare, 1991 (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999)].

The Study of Psychopathy in Nonclinical Samples

In an effort to clarify the relationship between anxiety and psychopathy, Fowles (2000) suggested the importance of studying psychopathic characteristics in nonclinical samples to gain a better understanding of the nature of psychopathy. As alluded to earlier, several studies have examined the relation of psychopathy and electrodermal hyporeactivity, generally supporting a positive relationship between these variables. The few studies that exist suggest electrodermal reactivity is related to personality or temperamental variables. Researchers demonstrated that nonclinical individuals who are less electrodermally responsive showed greater disinhibition, less restraint in social behavior, greater aggression and hostility, increased dominance and irresponsibility, and less cooperation (Block, 1957; Jones, 1950). In addition, other research has suggested that electrodermal responsivity is strongly genetic and that electrodermal reactivity in children was related to a fearful temperament (Fowles & Kochanska, 2000; Lykken et al, 1989). Further, skin conductance levels have shown differential relationships with introversion and extraversion, with introverts reaching an optimal level of arousal at lower levels than extraverts (Smith, 1984). Individuals who exhibit a greater degree of empathy have been shown to demonstrate greater skin conductance responses when exposed to emotionally laden stimuli (Mehrabian et al., 1989).

In more recent work that explored physiological reactivity in the context of a guided imagery task, a nonclinical group demonstrated electrodermal hyporeactivity when exposed to anxiety-inducing vignettes (Bare, Hopko, & Armento, 2004). While these results were generally consistent with research indicating that individuals with psychopathy exhibit electrodermal hyporeactivity, they were not consistent with previous research in that electrodermal hyporeactivity was more associated with emotional detachment rather than antisocial behavior patterns (Patrick et al., 1994). Other research has shown that a nonclinical sample of individuals with a greater number of psychopathic traits exhibited increased risk taking as assessed by both self-report and behavioral measures of risk taking (Hunt, Hopko, Bare, Lejuez, & Robinson, in press). These results were consistent with research conducted with psychopathic individuals.

Risk-taking, Disinhibition, and Psychopathy

Risk-taking is defined as engagement in behaviors that simultaneously involve a high potential for punishment and opportunity for reward (Leigh, 1999). Consistent with this idea, substantial research has accumulated showing that psychopathic individuals more frequently engage in higher-risk behaviors including high risk sexual behaviors, drug and alcohol abuse, pathological gambling, and engage in more institutional misconduct following incarceration (Blackburn & Maybury, 1985; Blair, Colledge, &

Mitchell, 2001; Blaszczynski, Steel, & McConaghy, 1997; Brown & Forth, 1997; Buffington-Vollum, Edens, Johnson, & Johnson, 2002; Capaldi et al., 2002; Fals-Stewart et al., 2003; Gretton, Hare, & Catchpole, 2004; Hare, 1999; Ladd & Petry, 2003; Steel & Blaszczynski, 1996; Thornquist & Zuckerman, 1995; Verona, Patrick, & Joiner, 2001; Zuckerman, 2002; Zuckerman et al., 1978). Among non-clinical samples, increased propensity to take risks has been associated with increased alcohol and drug use, cigarette smoking, gambling, theft, aggression, and unprotected sexual intercourse in both adolescent and adult samples (Aklin, Lejuez, Zvolensky, Kahler, & Gwadz, in press; Lejuez, Aklin, Zvolensky, & Pedulla, 2003; Lejuez et al., 2002; Lejuez, Simmons, Aklin, Daughters, & Dvir, 2004). The relation of risk taking and psychopathic characteristics has been studied minimally, however recent data suggest psychopathy may be related to increased risk taking in nonclinical samples (Hunt, Hopko, Bare, Lejuez, & Robinson, in press).

Disinhibition has been associated with high- risk sexual behavior in a nonclinical sample (Bancroft et al., 2003) and generally appears related to psychopathy (Gregory, 2002; Hall, Benning, & Patrick, 2004). Disinhibition is a facet of risk taking that it is related more specifically to interpersonal risk taking and has been defined as the capacity to inhibit approach behaviors in the presence of cues associated with punishment. Generally, researchers have suggested males show increased behavioral disinhibition compared to females (Segarra, Molto, Torrubio, 2000; Zagon & Jackson, 1994; Zuckerman 1994). Further, disinhibition is positively correlated with psychopathy and antisocial behaviors in both institutionalized and noninstitutionalized populations, and both clinical and nonclinical populations with psychopathic traits show difficulties avoiding punishment (Kosson, Smith, & Newman, 1990; Levenson, 1990; Levenson, Kiehl, & Fitzpatrick, 1995; Newman & Kosson, 1986; Newman & Schmitt, 1998; Thornquist and Zuckerman, 1995).

Executive Functioning and the Psychopath

Researchers have recently suggested that in addition to electrodermal hyporeactivity and increased risk taking and disinhibition, psychopaths may exhibit executive functioning deficits (Fowles, 2000; Ishikawa et al., 2001). Executive functioning skills are those skills involved in planning and decision-making that allow an individual to engage in behaviors that are situationally appropriate (Spreen & Strauss, 1998). Researchers have demonstrated that psychopaths show electroencephalographic abnormalities and abnormal attention processes, and they performed significantly worse on measures of ventral frontal functioning when compared to nonpsychopathic criminals (Damasio et al., 1990; Lapierre, Braun, & Hodgins, 1995). Researchers also have found that there is a robust relationship between antisocial behavior and executive functioning deficits (Morgan & Lilienfeld, 2000). However, they noted that the relationship between antisocial behavior and executive functioning in psychopaths may be moderated by substance abuse and/or a function of specific comparison groups. Consequently, further research is necessary to clarify the potential relationship between executive functioning and psychopathy.

Widom (1978) originally proposed a more complicated relationship between psychopathy and executive functioning. He suggested that "successful" psychopaths might not exhibit the executive functioning deficits that are presumed to be present in classic “unsuccessful” psychopaths. More recent research has provided provisional support for Widom’s contention that “successful” psychopaths exhibit executive functioning skills that may protect them from being detected and arrested for their behaviors (Bihrle & Lacasse, 2001; Ishikawa et al., 2001). However, this finding warrants further investigation due to methodological limitations, most notably the observation that the control group did not demonstrate a significantly different level of skin conductance than the psychopathy group. The authors suggest that the task used in the study might not have provided the type of stimulus necessary to elicit the appropriate physiological response. As a result, the relationship between psychopathy and executive functioning remains unclear, and the association between executive functioning and non-clinical psychopathy remains entirely unexplored.

Fowles’ Model of Psychopathy

In an attempt to clarify the disparate findings related to electrodermal reactivity, anxiety, disinhibition and executive functioning and their relationship to psychopathic traits, Fowles (2000) has proposed that electrodermal reactivity might have differential relationships with different aspects of anxiety, (e.g. trait, state, and somatic anxiety), as well as to decreases in inhibitory control, which may appear as executive functioning deficits. In particular, he has suggested that reduced electrodermal hyporeactivity may be related to both factors of psychopathy (i.e. emotional detachment and behavioral disinhibition), but the relationships with each factor may be affected by the context in which the anxiety and disinhibition are elicited. Fowles suggests that psychopaths lack the physiological responses and subsequent anxiety related to behaviors that could potentially lead to negative consequences, thereby increasing the likelihood that the psychopath will engage in these behaviors and will be unable to engage in inhibitory control of their actions. Consequently, the executive functioning deficits that have been suggested to be associated with psychopathic traits may actually be secondary to psychopaths' reduced inhibitory control. Finally, Fowles suggests that while electrodermal reactivity may be related to both anxiety and inhibitory control, the extant literature is too limited to provide information necessary to clarify the relationships between electrodermal reactivity, anxiety, executive functioning, and behavioral disinhibition. Fowles proposes that studying correlates of electrodermal hyporeactivity in nonclinical samples may eliminate confounding variables associated with a diagnosis of psychopathy (e.g., comorbid disorders) and may clarify the relationships between psychopathy, anxiety, risk taking and executive functioning.

Statement of the Problem

Recent research has suggested that among individuals diagnosed with psychopathy, electrodermal hyporeactivity, decreased trait and somatic anxiety (but see Schmitt & Newman, 1999), risk taking, disinhibition, and executive functioning deficits may be inter-related in complex and poorly understood ways (Fowles, 2000). Equally as important, considering research demonstrating similarities between psychopaths and nonclincial individuals with psychopathic traits (Bare, Hopko, & Armento, 2004; Block, 1957; Hunt et al., in press; Levenson et al., 1995; Lilienfeld & Andrews, 1996), continued empirical research is necessary to explore the relations among electrodermal reactivity, disinhibition, anxiety, and executive functioning deficits in non-clinical samples of individuals high in psychopathic traits. This research is important toward better delineating the phenomenological experience of psychopathy and further assessing whether characteristics of psychopathy in clinical samples generalize to nonclinical samples. To the extent that cross-sample consistencies are apparent, future development of assessment and primary intervention strategies targeting high-risk individuals may proactively reduce the likelihood that these individuals will develop clinical psychopathy. Accordingly, the primary purpose of the present study was to conduct a preliminary investigation to build upon theoretical perspectives of nonclinical psychopathy and explore potential similarities with research findings specific to well-diagnosed psychopaths. To accomplish these objectives, participants were exposed to visual stimuli of varying degrees of aversiveness while physiological data were recorded and were also asked to complete both an executive functioning task (i.e., Wisconsin Card Sorting) and risk taking activity (i.e., Balloon Analog Risk Task or BART). The following hypotheses were based on previous research and the extant psychopathy literature:

1. Based on extensive literature consistently demonstrating that increased psychopathic traits in clinical populations are associated with reduced electrodermal skin conductance, it was hypothesized that nonclinical individuals with higher psychopathic traits (as indexed via the SRP-II) would exhibit reduced electrodermal skin conductance when exposed to aversive visual stimuli.

2. Due to research demonstrating a connection between physiological responsivity and the emotional experience of anxiety, it was hypothesized that decreased anxiety (as indexed via the self report anxiety measures (STAI-T and BAI) would be associated with reduced electrodermal skin conductance when exposed to aversive visual stimuli.
3. Existing research and theory generally suggest psychopaths suffer from executive functioning deficits. Consequently, it was hypothesized that individuals with higher self-reported psychopathy scores would demonstrate impaired executive functioning as assessed by the Wisconsin Card Sorting Task.
4. Psychopaths have shown a tendency to engage in risky behaviors and to have difficulty inhibiting behaviors that lead to punishment. It was hypothesized that individuals with higher self-reported psychopathy scores would demonstrate greater impulsivity and disinhibition (i.e., risk-taking) as evidenced by both self-report measures of impulsivity and behavioral measures of disinhibition.

CHAPTER 2

METHOD

Participants

Participants were 92 undergraduate psychology students at the University of Tennessee who participated to fulfill a class requirement. The mean age of the participants was 21.9 years ($SD = 6.1$) and 54.3% ($n = 51$) were women. The ethnic distribution was as follows: 90.1% Caucasian ($n = 83$), 6.6% African-American ($n = 6$), 1.1% Latino, ($n = 1$), and 2.2% Asian ($n = 2$). Prior to beginning the study, participants were informed of the nature of the tasks they would be completing and signed consent forms.

Materials

Self-Report Measures

The *Spielberger State-Trait Anxiety Inventory – Trait scale* (STAI-T; Spielberger et al., 1983) is a 20-item scale designed to measure trait anxiety (R = 20-80). Psychometric data suggest adequate internal consistency and construct validity in heterogeneous samples (Himmelfarb & Murrell, 1983; Kabacoff et al., 1997; Stanley et al., 1996). Good to excellent internal consistency has been reported for the scale (α's between .86 and .95) across adult, college, high school, and military recruit samples (Spielberger et al., 1983), as well as older adults ($\alpha = .88$, Stanley et al., 1996). Adequate

30-day test-retest reliability with high school students (r = .75) and 20-day test-retest reliability with college students has been reported (r = .86; Spielberger et al., 1983). Convergent validity of the STAI-T and other measures of anxiety are evident among both normal and anxiety disorder samples (Beiling, Antony, & Swinson, 1998; Creamer et al., 1995). Internal consistency in the present sample was high (α = .83)

The *Beck Anxiety Inventory* (BAI; Beck & Steer, 1993) is a 21-item, self-report measure of psychosomatic and cognitive symptoms of anxiety (R = 0-63). Good psychometric properties have been demonstrated for the measure among community, medical, and psychiatric outpatient samples (Kabacoff et al., 1997; Morin et al., 1999; Steer, Willman, Kay, & Beck, 1994; Wetherell & Areán, 1997). Specifically, internal consistency of the measure was strong as assessed via data obtained from older medical patients, mixed psychiatric samples, and patients with anxiety disorders (α = .85-.92). Adequate to good test-retest reliability has been demonstrated for anxiety patients (r = .75 - .83, Beck et al., 1988; de Beurs, Wilson, Chambless, Goldstein, & Feske, 1997). The measure also was moderately correlated with anxiety (r = .36-.69) and depression measures (r = .25-.56) completed by psychiatric (Beck et al., 1988) and normative student samples (Osman, et al., 1997). Internal consistency in the present sample was high (α = .89).

The *Self-Report Psychopathy Scale - Revised* (SRP - II; Hare et al., 1989; Hare, 1991b) is a 60-item self-report measure of psychopathic traits. The instrument was developed as an analogue to the clinician administered Psychopathy Checklist – Revised (Psychopathy Checklist - Revised; Hare, 1991a). Similar to the Psychopathy Checklist – Revised, two factors (emotional detachment and antisocial behavior) initially were proposed for the SRP-II (Hare et al., 1989), though subsequent factor analyses revealed a somewhat modified (but empirically weak) two-factor solution that included "emotional stability" and "manipulative trouble-making" (Williams & Paulhus, 2004). Given the inadequacy of this latter factor solution and our objective of maintaining consistency with more traditional conceptualizations of psychopathy, we maintained the original factor designation and scoring procedures (Hare et al., 1989). Although the optimal factor structure of the SRP-II admittedly is undetermined, there are some data to support its scientific utility. For example, the SRP-II has strong predictive validity for delinquency (Williams & Paulhus, 2004) and correlates moderately (and as well as MCMI-II APD scale scores) with DSM-IV Antisocial Personality Disorder criteria (Widiger et al., 1996; $r = .41$) and the Psychopathy Checklist - Revised (Hare, 1991b; $r = .54$). Convergent validity of the Self- Report Psychopathy Scale is supported by significant correlations with MMPI-2 Psychopathic Deviate subscales (Lilienfeld, 1999), the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996), peer ratings on Cleckley's psychopathy criteria, and Levenson's primary and secondary psychopathy scales (Levenson, Kiehl, & Fitzpatrick, 1995). Higher scores on the Self-Report Psychopathy Scale - II have been found to be associated with increased lying and narcissistic behavior, as well as decreased empathy (Zagon & Jackson, 1994). Coefficient alpha for the Self-Report Psychopathy Scale - II was .86 in the present study (factor I $\alpha = .69$; factor II $\alpha = .80$).

The *Barratt Impulsiveness Scale* (BIS; Barratt, 1983, 1985) is a self-report measure of disinhibition. It addresses three aspects of disinhibition: "cognitive impulsiveness," "motor impulsiveness," and "nonplanning impulsiveness." Barratt

(1959) has demonstrated that the BIS has adequate test-retest reliability across different populations (α = .79 to 83). Researchers have demonstrated adequate internal consistency for university undergraduates (α = .82), prison inmates (α = .80), substance abuse patients (α = .79), and psychiatric patients (α = .83; Patton, Stamford, & Barratt, 1995). Internal consistency in the present study was high (α = .83).

The *International Affective Picture System* is composed of 600 slides that depict a number of different scenes an individual may encounter in everyday life. These pictures range from fairly neutral and innocuous stimuli to fairly aversive, unpleasant stimuli. Participants were asked to view and rate 66 pictorial stimuli from the International Affective Picture System (IAPS; Center for the Study of Emotion and Attention, 1995). Twenty-one pictures were chosen to represent pleasant, neutral, and unpleasant content, respectively. Images were grouped according to the degree of aversiveness as determined by past research on the IAPS (Center for Study of Emotion and Attention, 1995). All visual images were presented via computer, and participants were asked to rate their experience of the aversiveness of each set of the images following the presentation of each set. Ratings were made on a 9-point Likert-type Subjective Units of Discomfort (SUDS) scale ranging from very pleasant (1) to very unpleasant (9). The presentation of stimulus sets was counterbalanced to avoid order effects.

Behavioral Measures

The *BART Task* is a measure of risk-taking propensity that has been shown to correlate with risk-related constructs such as impulsivity (r = .24) and sensation-seeking (r = .35) (Lejuez, et al., 2002). The task incorporates a computer simulated balloon accompanied by a balloon pump, a reset button labeled "Collect Points," a permanent points earned display labeled "Total Earned," and a second display listing the points earned on the last balloon and labeled "Last Balloon". Each click on the pump inflates the balloon one degree (about .125" in all directions). Five points for each pump of the balloon is put in a temporary bank. Thus, the bigger the subject inflates the balloon, the more points are accrued in this temporary bank. The catch, however, is that each balloon has a predetermined "explosion" point. Once a balloon is inflated to its explosion point, a "pop" sound effect is generated from the computer and the balloon breaks. When a balloon breaks, all points in the temporary bank are lost and the next uninflated balloon appears on the screen. A subject does not have to inflate the balloon until it explodes. At any point during each balloon trial, the participant can stop pumping the balloon and click the "Collect Points" button. Clicking this button would transfer all points from the temporary bank to the permanent bank, during which the new total earned would be incrementally updated point by point while a slot machine payoff sound effect played.

The *Wisconsin Card Sort Task* (WCST; Heaton, 1993) is a measure of executive functioning and is intended to measure abstract reasoning and the ability to shift cognitive strategies when faced with changing stimuli. It requires strategic planning, organized searching, and the use of environmental feedback to shift strategies to solve problems. The WCST involves the presentation of four stimulus cards and two sets of 64 response cards. The test requires examinees to determine the correct sorting principle or rule and maintain that set across changing stimulus conditions. It has been demonstrated to have adequate reliability and validity (Heaton, 1993). We used the computerized administration in the present study.

Psychophysiological Measures

Heart rate (HR) and skin conductance level (SCL) were collected using a Biopac MP 100 data collection device at a sample rate of 10 samples/s across all channels using Biopac's Acqknowledge Software. SCL (in microsiemens) was obtained using the Biopac GSR100B electrodermal activity amplifier with the TSD103A Ag-AgCl electrodes placed on the middle segment of the middle and ring fingers. Raw electrocardiogram data were collected using the Biopac ECG100B Electrocardiogram amplifier, with disposable Ag/AgCl electrodes aligned in a standard configuration (right and left of sternum and just below the clavicle). These raw data were converted to obtain HR in beats per min.

Physiological response magnitudes were calculated for the three IAPS conditions (Neutral, Pleasant, Unpleasant) by subtracting baseline skin conductance and heart rate from the mean skin conductance and heart rate recorded during the task (i.e. mean – baseline = response magnitude). Accordingly, each individual had an index of response magnitude for both skin conductance and heart rate (one for each stimuli condition), with larger values indicating increased physiological responding.

Procedure

A pair of experimenters, one of whom interacted with the participant, conducted the experiment. The other collected physiological data in an adjacent room, separated by a wall with a one-way mirror. The experimenter monitoring the physiological data was able to observe the other experimenter and participant in the adjacent room. An intercom system allowed the experimenter monitoring the physiological data to listen to the participant and second experimenter's interaction.

Participants initially were greeted by the experimenter, who explained the study and asked the participant to complete informed consent procedures. The experimenter also explained that another experimenter would be observing the procedure through the one-way mirror. After completing the consent form, participants completed self-report questionnaires. Upon completion of self-report measures, the experimenter assisted the participant in attaching electrodes to be used for physiological data collection. Following attachment of electrodes, the experimenter instructed the participant to relax in order to collect baseline physiological data. The experimenter left the room while 5 minutes of baseline physiological data were collected. After baseline data were collected, the experimenter returned to the participant room to explain the remainder of the experimental procedures. The participant was then instructed to complete the BART, the WCST, and the pictorial stimuli from the IAPS (both the tasks and visual stimulus sets were presented in counterbalanced order). In the latter task, each pictorial stimulus from the IAPS was presented for 6 seconds. Participants were instructed to view each of the pictures as they were presented and to make ratings of their subjective experience of the aversiveness and anxiety created by the visual stimuli on a 9-point Likert-type scale ranging from 1 (least aversive or anxiety-inducing) to 9 (most aversive or anxiety-inducing). One rating was given for each of the three stimulus sets (Pleasant, Neutral, and Unpleasant).

CHAPTER 3

RESULTS

Zero Order Correlations and Descriptive Data

Descriptive data for self-report measures and behavioral tasks are presented in Table A-1 and zero-order correlations among these variables are presented in Table A-2. Self-report anxiety measures were moderately correlated ($r = .45, p < .01$). Consistent with previous research and traditional conceptualizations of the psychopathy/anxiety relationship (Cleckely, 1941; Schachter & Latane, 1964; Hare 1965; Hare & Quinn, 1971; Mathis, 1970; Waid & Orne 1982), the STAI ($r = -.55, p < .01$) and BAI ($r = -.36$, $p < .01$) were both significantly (and inversely) correlated with Self-Report Psychopathy Scale - II factor 1. Also consistent with the extant literature, neither the STAI nor BAI were significantly correlated with Self-Report Psychopathy Scale - II factor 2 scores. Of the self-report anxiety measures, only the STAI was significantly correlated with the Self-Report Psychopathy Scale - II total score ($r = -.32, p < .01$). The BIS was significantly correlated with the Self-Report Psychopathy Scale - II factor 2 ($r = .42, p < .01$) and the Self-Report Psychopathy Scale - II total score ($r = .28, p < .01$), findings consistent with the traditional view of psychopathy and the two-factor structure of the Self-Report Psychopathy Scale - II (Hare 1999; Harpur, Hakstian, & Hare, 1988). Participant gender was significantly correlated with WCST perseverative errors ($r = .25$, $p < .05$), Self-Report Psychopathy Scale - II total scores ($r = -.34, p < .01$), and Self-

Report Psychopathy Scale – II factor 2 ($r = -.28, p < .01$) scores, with male gender associated with greater Self-Report Psychopathy Scale - II total and factor 2 scores and fewer perseverative errors. Independent samples t-tests were conducted to assess gender differences on total Self-Report Psychopathy Scale - II scores and Self-Report Psychopathy Scale - II factor 2 scores. Males obtained significantly higher total Self-Report Psychopathy Scale - II scores ($t = 3.39, p < .01$; males = 226.0 females = 204.2) and factor 2 scores ($t = 2.76, p < .01$ males = 48.43, females = 41.53. The total number of BART pumps also was significantly correlated with Self-Report Psychopathy Scale – II factor 2 score ($r = .23, p < .05$).

Table A-3 presents correlations between self-report measures and physiological responsivity. Both self-report anxiety measures were significantly positively correlated with heart rate responsivity to neutral stimuli (STAI: $r = .26, p < .05$; BAI: $r = .28, p < .05$). Self-report psychopathy scores were positively correlated with skin conductance responsivity to pleasant stimuli ($r = .24, p < .05$).

Visual Stimuli Manipulation Check

To determine the effects of the experimental manipulation, repeated measures ANOVAs were conducted for the sample for self-reported anxiety following each task and self-reported aversiveness (unpleasantness) associated with each condition. Repeated measures ANOVAs were also conducted to determine skin conductance response and heart rate response magnitudes as a function of visual stimuli. Participants reported significantly greater aversiveness for the unpleasant images compared to the neutral and pleasant images [F (2, 86) = 175.14, $p < .01$: unpleasant $M = 6.22$, $SD = 2.25$; pleasant $M = 1.47$, $SD = 1.37$; neutral $M =1.80$, $SD = 1.40$]. Participants also reported significantly greater anxiety when viewing the unpleasant images compared to both neutral and pleasant images [F (2, 86) = 76.87, $p < .01$: unpleasant $M = 5.32$, $SD = 2.01$; pleasant $M = 2.15$, $SD = 1.73$; neutral $M = 2.26$, $SD = 1.80$]. Skin conductance magnitudes were not in the expected direction in that responses to neutral images were larger than responses to unpleasant images as well as pleasant images [F (2, 83) = 3.82, $p = .03$ (unpleasant $M = 2.12$, $SD = 2.73$; pleasant $M = 1.75$, $SD = 2.47$; neutral $M = 2.18$, $SD = 2.67$)]. Participants did not exhibit significantly different heart rate response magnitudes when exposed to the three classes of stimuli F (2, 83) = 1.09, $p = .34$ (unpleasant $M = -2.63$, $SD = 14.41$; pleasant $M = -2.25$, $SD = 4.60$; neutral $M = -1.16$, $SD = 8.29$).

Regression analyses were conducted to determine the relationships between self-reported anxiety, self-reported psychopathy, and anxiety and aversiveness ratings related to each image set. Self-reported anxiety and psychopathy scores did not significantly predict anxiety ratings for neutral images (adjusted $r^2 = -.01$, $F(4,80) = .75$, $p =.56$), pleasant images (adjusted $r^2 = -.04$, $F(4,79) = .19$, $p = .94$), or unpleasant images (adjusted $r^2 = .02$, $F(4,79) = 1.50$, $p =.21$). Self- reported anxiety and psychopathy scores did not account for significant variance for neutral images (adjusted $r^2 = -.03$, F (4,79) = .32, $p = .87$), pleasant images (adjusted $r^2 = -.02$, F (4,79) = .66, $p = .62$) or unpleasant images (adjusted $r^2 = .03$, F (4,79) = 1.63, $p = .18$).

Regression Analyses

A series of simultaneous regression analyses were conducted to test the prediction that individuals with a greater number of psychopathic traits would demonstrate reduced electrodermal skin conductance when exposed to aversive pictorial stimuli. As presented in Table A-4, none of the variables accounted for significant variance in predicting skin conductance responsivity for unpleasant images (adjusted $r^2 = .08$, $F(5, 76) = 1.40$, $p = .24$). Tables A-5 and A-6 contain results of similar regression analyses for pleasant and neutral images, respectively.[1] Participant sex accounted for differences in skin conductance responsivity for pleasant images (adjusted $r^2 = .13$, $F(5,78) = 3.47$, $p < .01$). None of the variables accounted for significant differences in skin conductance for neutral images (adjusted $r^2 = .02$, $F(5, 77) = 1.32$, $p = .27$).[2,3]

Tables A-7, A-8, and A-9 contain results of regression analyses to determine whether Self-Report Psychopathy Scale - II scores would predict heart rate responsivity. Heart rate responsivity to pleasant and negative visual stimuli was not significantly predicted by sex, self-reported psychopathy, or anxiety. However heart rate responsivity to neutral images was significantly predicted by participant sex (adjusted $r^2 = .09$,

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[1] Note that similar results were obtained when the SRP-II total score was used as a predictor variable in place of the factor scores.

[2] A regression analysis was conducted to test the possible interaction of sex with self reported anxiety and psychopathy. However, sex did not significantly predict electrodermal responsivity to unpleasant, pleasant, or neutral images.

[3] The potential effect of experimenter sex was considered as a potential confound. However, research suggests the effects of a male experimenter might be evident in the form of increased anxiety in female participants. The null findings with regard to skin conductance and anxiety suggested statistical analysis of this potential effect was unnecessary.

F (6,76) = 2.29, p = .04), with males demonstrating increased heart rate responsivity to neutral images.

To test the prediction that individuals with higher self-reported psychopathy scores would demonstrate greater impulsivity and risk-taking, a regression analysis was conducted for both self-reported impulsivity and the behavioral measure of risk taking (i.e., BART) [see Tables A-10, A-11, and A-12]. SRP- II factor 2 scores significantly predicted self-reported impulsivity (adjusted r^2 = .21, F (5,81) = 5.54, p < .01). Participant sex and Self-Report Psychopathy Scale - II factor 2 scores significantly predicted behavioral risk taking as measured by the total number of BART pumps (adjusted r^2 = .10, F (5,76) = 2.80, p = .02). A regression analysis was also conducted to determine whether Self-Report Psychopathy Scale - II scores predicted total number of BART explosions. None of the variables accounted for significant differences in total number of explosions (adjusted r^2 = -.03, F (5, 76) = .49, p = .79).

To test the hypothesis that individuals with higher self-reported psychopathy scores would demonstrate reduced executive functioning, a simultaneous regression analysis was conducted with participant sex, self-reported anxiety, and self-reported psychopathy scores as predictors. As can be seen in Table A-13, participant sex accounted for significant amounts of variance in the prediction of executive functioning (adjusted r^2 = .05, F (5,72) = 1.81, p = .12).

CHAPTER 4

DISCUSSION

Contrary to our hypothesis, individuals with higher Self-Report Psychopathy Scale - II scores did not demonstrate reduced electrodermal responding when exposed to aversive pictorial stimuli. These results are interesting in that analyses (collapsed across the sample) supported the effectiveness of the experimental manipulation, with Unpleasant stimuli associated with increased self-reported anxiety and aversiveness ratings. However, contrary to our hypotheses, self-reported psychopathy scores were not predictive of the degree to which participants found images anxiety-inducing or aversive. Given the robust literature that supports the relation between psychopathy and electrodermal hyporeactivity, at least two explanations are plausible in interpreting results. First, the visual stimuli sets may not have included significantly intense stimuli to elicit physiological responsivity. Although manipulation analyses indicated participants reported that neutral images were less anxiety-inducing than either the unpleasant or pleasant image sets and the unpleasant images were more anxiety-inducing than the other sets, it is possible that the unpleasant stimuli did not include significantly unpleasant images so as to result in substantial skin conductance differences as a function of psychopathy. Recent research provides some potential guidance related to selection of images that may lead to significant differences in skin conductance (Schupp et al., 2004). Schupp and colleagues (2004) found images of death and mutilation prompted the largest skin conductance responses for negative images and sexually arousing images prompted the largest skin conductance differences for pleasant images. Images used in the current study included some sexually arousing images (though not sexually explicit), but they did not include extreme scenes of death or mutilation due to concerns of inadvertently traumatizing participants. More extreme images may be required to reduce the possibility of Type II error and provide an experimental context where skin conductance responsivity would be observed. As a second potential reason for the null findings, lack of a relation between skin conductance responsivity and self-reported psychopathy may be a function of the nonclinical sample used in the study. The current sample may be too homogeneous or in too restricted a range of psychopathy so as to negate any potential effects of the experimental manipulation.

An unexpected finding with regard to skin conductance responsivity was that participant sex significantly predicted electrodermal reactivity to pleasant images. These results indicated that relative to males, females showed greater skin conductance reactivity to pleasant images. This difference may be due to the types of images included in the image sets. For example, the pleasant images stimulus set included some items (i.e. substantial sports content) that might elicit differential physiological responses as a function of gender. It is also possible these results are an artifact of the current sample. Another unexpected finding was that participant sex predicted heart rate responsivity to neutral images. This was a counterintuitive finding in that images were specifically chosen based on their documented properties as not eliciting significant emotional responses (Lang, 1979). Accordingly, this finding is likely an artifact of the current sample and should be replicated in future research.

The hypothesis that lower self-reported anxiety scores would be associated with reduced physiological responsivity to unpleasant images was not supported in the present study. Again, this may have been due to the limited intensity of unpleasant images that consequently failed to elicit significant electrodermal responses from participants. It should be noted, however, that psychopathic traits were associated with reduced levels of self-reported anxiety as assessed by the BAI and STAI. This finding is consistent with past research suggesting a more traditional, inverse relationship between psychopathic traits and anxiety (Lykken, 1957; Zagon & Jackson, 1994) as opposed to research suggesting a nonexistent or positive relationship between anxiety and psychopathic traits (Ray, 1983; Schmitt & Newman, 1999). While anxiety was negatively related to psychopathic traits in the present study, the lack of physiological correlates of reported anxiety suggest further research is necessary to elucidate the relationship between anxiety, physiological responsivity, and psychopathic traits in a nonclinical sample. Further, the null findings may be due to the restricted range of the self-reported psychopathy scores in the present sample.

The hypothesis that individuals with a greater number of psychopathic traits would demonstrate reduced executive functioning was not supported in the present study. Research conducted by Ishikawa and colleagues (2001) showed "successful" psychopaths demonstrated greater executive functioning than a control group. The authors suggested intact executive functioning may be a protective factor that is characteristic of most non-psychopaths (barring other psychiatric, medical, or organic problems), or if intact among psychopaths, intact executive functions may decrease the likelihood of psychopaths being identified (e.g., more successful, less impulsive). In this light, the present sample may generally have included individuals not predisposed toward developing clinical psychopathy in the first place. Alternatively, given that this was a nonclinical (and educated) sample, even if a substantial proportion of individuals were predisposed to psychopathy and corresponding executive functioning deficits (which is unlikely), these individuals may be of the "successful" variety, with normative executive functioning abilities that would not differ from individuals with minimal psychopathic characteristics.

Indeed, given the (student) demographic of the sample, the likelihood of observing marked executive functioning deficits may have been minimal in hindsight, in that if these deficits existed, these individuals would be more likely to be incarcerated (if related to psychopathy) or receiving extensive medical care (if related to an organic disorder) as opposed to completing an undergraduate education. Alternatively, speculating that subtle executive functioning deficits might exist in a nonclinical sample, the non-supportive findings in the present study may be related to the sensitivity of the executive functioning measure utilized. Morgan and Lilienfeld (2000) have suggested different brain regions may be related to different types of executive functioning deficits and require testing specific to the brain region involved. It is possible that the executive functioning measure used in this study did not provide enough power to discriminate differences between individuals with varying degrees of psychopathic traits. Lapierre, Braun, and Hodgins (1994) found psychopaths demonstrated significantly greater deficits on measures of ventromedial functioning compared to nonpsychopaths. The Wisconsin Card Sort Task is presumed to be a measure of dorsolateral functioning and may not have provided a test of the specific brain region that may be most important in distinguishing between individuals with psychopathic and nonpsychopathic traits. Thus, the WCST may not have tapped the specific region of the brain that may be related to presumed executive functioning deficits related to psychopathic traits. It should be noted that the present study utilized the computerized version of the WCST while most other research has utilized the traditional card-based version of the WCST. It is possible the computer-based version of the WCST may have resulted in the current null findings due to the different nature of the task the participant was asked to complete. Additionally, an unexpected finding of the present study is that participant sex accounted for a significant amount of the variance for perseverative errors, with females demonstrating increased perseverative errors. No previous research exists to support this finding and this result is likely to be an artifact of the current sample.

The hypothesis that individuals with higher self-reported psychopathy scores would demonstrate greater disinhibition and risk taking was supported in the current study for both self-report and behavioral measures. This effect appeared to be specifically related to factor 2 of the Self-Report Psychopathy Scale - II and provides support for the two-factor model of psychopathy (Hare 1991). Consistent with past research, risk taking (as measured by the BART), was associated with increased self-reported psychopathic behaviors (Self-Report Psychopathy Scale - II factor 2 scores) (Lejuez et al., 2002; Hunt, Hopko, Bare, Lejuez, Robinson, in press). Furthermore, in the current study males demonstrated increased risk taking and disinhibition compared to females. This research is consistent with a growing body of research related to gender differences and disinhibition. Menzies (1997) has suggested males may be expected to demonstrate increased levels of impulsivity due to cultural factors that reinforce males for taking risks while punishing females for similar behaviors. Research has also shown that males demonstrate higher scores on measures of disinhibition and thrill and adventure seeking, constructs that are associated with factor 2 (Levenon, Kiehl & Fizpatrick, 1995).

In conclusion, despite the limitations of the current study, results suggest Fowles (2000) may have been correct in his assertion that the relationships between psychopathic traits and correlates of psychopathy may not be as simple as previously thought, particularly in a nonclinical sample. Many of the hypothesized relationships between psychopathic traits and correlates of psychopathy were not supported in the present study. However, results of the study are consistent with previous research suggesting that risk taking and impulsivity are related with the antisocial lifestyle (factor 2) facet of psychopathy (Lejuez et al, 2002; Hunt et al., in press). Further, the finding that increased psychopathic traits was associated with increased risk taking supports Fowles' suggestion that reduced BIS functioning may be related to psychopathic traits. The increased risk taking and reduced inhibition related to psychopathic traits in this study suggests individuals with a greater number of psychopathic traits may have been less likely to inhibit their pattern of responding despite the possibility of punishment. Unfortunately, the limited intensity of unpleasant visual stimuli and the specific executive functioning measure used in the present study were potential hindrances in clarifying the relationships between psychopathic traits, electrodermal reactivity, and other correlates of psychopathy.

Future research would benefit from attempts to increase the power of the experimental manipulations. For example, more extreme pleasant and unpleasant images would likely elicit greater skin conductance responses from participants. Likewise, a sample including participants with a wider range of psychopathy scores might eliminate the potential problem with restricted range and increase the likelihood of detecting differences in skin conductance responsivity. To address potential limitations in executive functioning measures, future research might benefit from utilizing multiple executive functioning measures more specifically related to the areas of the brain associated with presumed executive functioning deficits in psychopaths. Further, researchers should consider using the traditional card-based form of the WCST until data confirm that the computer version of the WCST represents an acceptable alternative. Future research should also strive to elucidate gender differences and their relations to psychopathic traits, physiological responsivity, risk taking, impulsivity, and executive functioning.

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APPENDIX

Table A-1

Descriptive Data for Sample

Variable	Mean	SD	Min	Max	Skew	Kurtosis
Pers. Errors	14.33	14.70	4.00	81.00	2.65	-.08
Pumps total	658.69	194.67	129.00	964.00	-.62	-.36
BAI total	9.55	7.33	1.00	43.00	1.71	4.54
STAI total	42.20	8.62	25.00	64.00	.47	-.10
BIS total	65.47	10.26	42.00	92.00	.16	-.20
SRP total	213.77	32.22	151.00	333.00	.87	1.90
SRP F1 total	33.16	7.50	15.00	56.00	.21	.72
SRP F2 total	44.56	12.20	17.00	80.00	.26	-.08

Table A-2

Correlations and Descriptive Data for all Variables

Instrument	1	2	3	4	5	6	7	8	9	10
1. SRPF1	--	.26*	.60**	-.55**	-.36**	.08	-.16	-.01	.13	.01
2. SRPF2		--	.80**	-.05	.05	.42**	-.28**	.23*	.03	.12
3. SRPTOT			--	-.32**	-.08	.28**	-.34**	.03	-.03	.03
4. TRAIT				--	.45**	.17	.04	-.05	-.15	-.05
5. BAI					--	.18	-.07	.11	-.15	.10
6. BIS						--	.04	.11	-.05	.10
7. SEX							--	.20	.25*	-.12
8. PUMPS								--	.02	.55**
9. PERERR									--	.03
10. EXPLO										--

*$p < .05$
**$p < .01$

Note: SRPF1= Self-report Psychopathy Scale Factor 1, SRPF2 = Self-report Psychopathy Scale Factor 2, SRPTOT = Self-report Psychopathy Scale Total Score, TRAIT = Trait Anxiety Inventory, BAI = Beck Anxiety Inventory, BIS = Barratt Impulsiveness Scale, PUMPS = BART adjusted total pumps, PERERR = WCST perseverative errors, EXPLO = BART total # of explosions.

Table A-3

Correlations Between Self-Report Measures and Physiological Responsivity

	TRAIT	BAI	BIS	SRP	NHR	PHR	UHR	NSC	PSC	USC
TRAIT	--	.45**	.17	-.32**	.26*	.10	-.06	.06	.05	.00
BAI		--	.18	-.08	.28*	.06	.11	.11	.13	.12
BIS			--	.28**	.02	-.02	-.11	-.01	.05	.09
SRP				--	-.06	.03	-.06	.12	.24*	.15
NHR					--	.56**	-.14	-.08	-.06	-.08
PHR						--	.16	.01	-.01	-.14
UHR							--	.04	-.01	.09
NSC								--	.79**	-.09
PSC									--	.82**
USC										--

Note: TRAIT = Trait Anxiety Inventory, BAI = Beck Anxiety Inventory, BIS = Barratt Impulsiveness Scale, SRP = Self-report Psychopathy Scale Total Score, NHR=Neutral Heart Rate Responsivity, PHR Pleasant Heart Rate Responsivity, UHR = Unpleasant Heart Rate Responsivity, NSC = Neutral Skin Conductance, PSC = Pleasant Skin Conductance, USC = Unpleasant Skin Conductance

Table A-4

Skin Conductance Responsivity to Unpleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.21	.64	-1.83	-.21	.07
Factor 1	.10	.05	.73	.08	.47
Factor 2	.06	.03	.55	.06	.58
STAI	.01	.04	.04	.00	.97
BAI	.13	.05	1.02	.12	.31

adjusted $r^2 = .02$

Table A-5

Skin Conductance Responsivity to Pleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.31	.53	-2.89	-.31	.01
Factor 1	.15	.04	1.19	.13	.24
Factor 2	.13	.02	1.13	.13	.26
STAI	.09	.04	.73	.08	.47
BAI	.11	.04	.91	.10	.37

adjusted $r^2 =.13$

Table A-6

Skin Conductance Responsivity to Neutral Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.21	.60	-1.86	-.21	.07
Factor 1	-.10	.05	-.71	-.08	.48
Factor 2	.11	.03	.93	.11	.36
STAI	.00	.04	.03	.00	.98
BAI	.05	.04	.39	.04	.70

adjusted r^2 =.02

Table A-7

Heart Rate Responsivity to Unpleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.12	3.50	-.97	-.11	.33
Factor 1	-.12	.29	-.84	-.05	.40
Factor 2	-.04	.15	-.31	-.02	.76
STAI	-.13	.24	-.88	-.06	.38
BAI	.02	.26	.12	.01	.91

adjusted r^2 = -.04

Table A-8

Heart Rate Responsivity to Pleasant Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.20	1.08	-1.73	-.19	.09
Factor 1	-.07	.09	-.49	-.06	.62
Factor 2	.04	.05	.35	.04	.73
STAI	.10	.07	.73	.08	.47
BAI	-.03	.08	-.20	-.02	.85

adjusted r^2 = -.00

Table A-9

Heart Rate Responsivity to Neutral Images as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.23	1.84	-2.07	-.23	.04
Factor 1	-.06	.15	-.48	-.06	.63
Factor 2	-.01	.08	-.10	-.01	.92
STAI	.16	.13	1.22	.14	.23
BAI	.17	.14	1.45	.16	.15

adjusted r^2 = .10

Table A-10

Self-reported Impulsivity as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	.17	2.05	1.62	.18	.11
Factor 1	.18	.16	1.46	.16	.15
Factor 2	.43	.09	4.13	.42	.00
STAI	.18	.14	1.52	.17	.13
BAI	.15	.15	1.36	.15	.18

adjusted $r^2 = .21$

Table A-11

BART Adjusted Total Pumps as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	.30	43.62	2.77	.30	.01
Factor 1	-.06	3.55	-.49	-.06	.63
Factor 2	.30	1.82	2.68	.29	.01
STAI	-.14	3.00	-1.05	-.12	.30
BAI	.14	3.17	1.19	.14	.24

adjusted $r^2 = .10$

Table A-12

Number of BART Explosions as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	-.05	.97	-.40	-.05	.69
Factor 1	-.07	.08	-.48	-.05	.64
Factor 2	.09	.04	.77	.09	.44
STAI	-.12	.07	-.82	-.09	.41
BAI	.12	.07	.95	.11	.35

adjusted $r^2 = -.03$

Table A-13

WCST Perseverative Errors as a Function of Sex, Self-Reported Psychopathy, and Self-Reported Anxiety

Predictor variable	Std Coef	SE	*t* score	partial corr	*p* value
Sex	.29	3.46	2.48	.28	.02
Factor 1	.08	.28	.57	.07	.57
Factor 2	.08	.15	.67	.08	.51
STAI	-.10	.24	-.69	-.08	.49
BAI	-.07	.25	-.54	-.06	.59

adjusted $r^2 = .05$

VITA

Robert Lewis Bare was born in Boone, NC on June 10, 1973. He was raised in Boone and graduated from Watauga High School before earning his B.A. in psychology from Appalachian State University in 1995. He received a M.A. in clinical psychology from Western Carolina University in 1997. He worked as a psychological associate in North Carolina before earning a Ph.D. in clinical psychology from the University of Tennessee, Knoxville in 2005.